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EXPERIMENTS ON CONTROL OF THE CITRUS RED MITE (PURPLE MITE)

SECOND REPORT

HERBERT SPENCER and PAUL A. NORMAN
U. S. D. A., Agr. Res. Adm., Bureau of Entomology and Plant Quarantine

The citrus red mite,[1] or purple mite, has become an important problem in Florida in recent years. In 1950 this pest was especially prevalent and troublesome.

Experiments on control of this pest were started in 1937 and are still under way. Spencer and Osburn (1949) in 1948 summarized progress in control up to that date. Oil emulsion or emulsive-oil sprays at from ½ to 1⅔ gallons per 100 gallons of water gave adequate control, but such applications are in addition to the regular sprays and, accordingly, are costly to growers. Moreover, they may injure the trees in cold weather or in very dry periods. Much needed was a miticide that could be added to the regular sulfur sprays. Among the newer insecticides dinitro-*o*-cyclohexylphenol (DN) was effective, was compatible with wettable sulfur, and has come into use for the cooler months, but may cause injury in hot weather. Neotran, containing 40 percent of bis(*p*-chlorophenoxy) methane, was effective in controlling the mites, compatible with materials in regularly scheduled sprays, and safe in summer and winter. Parathion gave promise of control, but in one instance a build-up of citrus red mites followed its use.

In 1949 and 1950 a number of new miticides became available for the experiments. This paper gives results with these materials, as well as additional information on the miticides previously found promising.

In 1949 a grove of Temple orange trees was arranged for a comparison of control of citrus red mites with parathion plus wettable sulfur, and combination sprays of wettable sulfur and the miticides Neotran, Karathane (2-capryl-4,6-dinitrophenyl crotonate, 25 percent, formerly called Arathane) and azobenzene. All the trees had been sprayed in February with a nutritional combination of zinc, manganese, and copper sulfates, hydrated lime, and wettable sulfur, and in April with a post-bloom application of basic copper sulfate plus wettable sulfur. As is usual after nutritional sprays that leave heavy residues,

[1] *Paratetranychus citri* (McG.).

severe mite infestation developed. On May 27, 80 percent of the leaves showed infestation by citrus red mites (eggs or crawlers). The experimental sprays were applied May 31 and June 3. Twenty days later the infestations were as follows:

Spray combination (quantities per 100 gal.)	Percent of leaves infested
Oil emulsion (1 percent oil)	4
Parathion, 25% wettable, 1 lb. + wettable sulfur 6 lbs.	89
Neotran 1 lb. + wettable sulfur 6 lbs.	3
Karathane 1 lb. + wettable sulfur 6 lbs.	6
Azobenzene, 70% wettable, 1 lb. + wettable sulfur 6 lbs.	24

The oil emulsion gave satisfactory control. The Neotran plus wettable sulfur and the Karathane plus wettable sulfur gave as good control as the oil. Some reduction also resulted from the azobenzene plus wettable sulfur, but the control was not sufficient. The parathion plus wettable sulfur may have killed a few adults when applied, but at the end of 20 days the infestation was heavier than before the spraying.

TABLE 1.—CONTROL OF CITRUS RED MITES* WITH COMBINATION SPRAYS, 1950.

Basic copper sulfate 3 lbs. plus wettable sulfur 5 lbs. per 100 gals. plus—	Percent of leaves infested	
	Prespray Mar. 14	After spraying May 10
No miticide (checks)	42	71
Neotran 1 lb.	39	19
Karathane 1 lb.	36	23
Azobenzene, 70% wettable, 1 lb.	53	9
EPN-300 ½ lb.	43	23
Aramite 2 lbs.	37	42
R-242 4 lbs.	42	27
923, 1 pt.	52	37
K-6451, 1 lb.	37	17

* Crawling adults, young stages, or unhatched eggs.

In 1950 several additional materials were available, including EPN-300 (ethyl *p*-nitrophenyl thionobenzene phosphonate, 30 percent), Aramite or 88-R (2-(*p*-tert-butylphenoxy)-1-methylethyl 2-chloroethyl sulfite, 15 percent), R-242 (*p*-chlorophenyl phenyl sulfone, 25 percent), 923 (dichlorophenyl benzenesulfonate, 50 percent emulsifiable), and K-6451 or C-854 (*p*-chlorophenyl *p*-chlorobenzene sulfonate, 50 percent). The same grove was arranged in randomized blocks, with 10 replications of

single-tree plots, for comparison of eight combination sprays of basic copper sulfate, wettable sulfur, and eight miticides. The sprays were applied post-bloom on March 15-17. A prespray estimate of infestation was made on March 14 and estimates of control were made on May 10. The spray combinations and results are given in Table 1.

All the new materials gave good control of the heavy infestation. The slow-acting azobenzene was the best miticide in this test, K-6451 was next, followed by Neotran. Aramite and 923 were the poorest, but they may show up better in future tests when used in increased amounts per 100 gallons in the sprays.

LITERATURE CITED

(1) Spencer, Herbert, and Max R. Osborn. 1949. Experiments on control of the citrus red mite. Proc. Fla. State Hort. Soc. (1948) 61: 95-101.

NOTICE

From time to time it is proposed to publish short notes about the activities of the members of the Florida Entomological Society. Items concerning promotions, travels, honors or awards, publications, etc. are particularly pertinent. Please send all such information to the editor.

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APHID TRAP RECORDS IN RELATION TO GREEN PEACH APHID INFESTATIONS IN SHADE-GROWN TOBACCO[1]

F. S. CHAMBERLIN
U. S. D. A., Agr. Res. Adm., Bureau of Entomology and Plant Quarantine

Three aphid traps of wind-vane type, similar to the trap designed by Shands et al. (1942), were operated throughout the 1948 and 1949 tobacco growing seasons in the Quincy, Florida, area. The object of this work was to obtain information concerning the flight of the green peach aphid, *Myzus persicae* (Sulz.), which has become an important pest in this shade-grown tobacco area.

The traps (fig. 1) were operated in typical localities at a height of 12 feet. They were examined and the aphids removed five times each week. Aphids were lost from a few traps, owing to tearing of the cloth netting by birds and windstorms, and very few aphids were taken on calm days, but the trap operation as a whole was considered generally satisfactory.

During the 19-week period of operation in 1948 the traps captured 13 green peach aphids out of the 236 aphids of 37 different species taken.[2] In 1949 only 5 green peach aphids were taken in the traps out of a catch of 191 aphids, involving 39 species.

The relatively small numbers of green peach aphids taken in the traps indicate a very limited flight of the species in this area and little probability of any appreciable influx from distant areas. Field observations in the Quincy area during the 1948-50 tobacco growing seasons have shown generally light, scattered populations of green peach aphids on crucifers and other occasional host plants. Only very limited flight movements would be expected to originate from these sources. Tobacco might well serve as abundant reservoirs for this aphid, but for the fact that most of the aphids on all tobacco plants in the area are eliminated by insecticide applications.

Although flight of the green peach aphid is evidently limited in the Quincy area, it is a factor of some importance in aphid control on tobacco. Previous observations (Chamberlin 1950) have shown that winged migrants of this aphid are the probable

[1] In cooperation with the North Florida Agricultural Experiment Station.

[2] The writer is indebted to L. M. Russell, Division of Insect Identification, Bur. Ent. and Plant Quar., for all identifications included in this paper.

source of initial aphid infestations in tobacco plant beds. The present evidence shows that relatively few aphids fly or are blown by the wind into shade-grown tobacco fields, where they may start colonies. This seems to occur most frequently dur-

Figure 1.—Wind-vane type of aphid trap used in flight studies of the green peach aphid. Quincy, Florida, 1948-49.

ing the tobacco-setting season, where the cloth sidewalls of these fields have not been erected. The open-mesh cheesecloth used for these sidewalls and for the tops of the fields serves as a barrier to aphids but does not completely exclude them. To obtain the greatest possible protection from infestation by these insects the construction of the cloth sidewalls and tops of tobacco shade fields should be completed prior to the tobacco-setting season. These facts also emphasize the value of using aphid-free tobacco transplants as means of minimizing aphid infestations on shade-grown tobacco.

A list of the species of aphids captured in the traps is given below:

Amphorophora sonchi (Oestl.)
Amphorophora sp.
Anoecia oenotherae Wilson
Anoecia sp.
Anuraphis maidi-radicis (Forbes)
Anuraphis middletonii (Thos.)
Anuraphis roseus Baker
Aphis abbreviata Patch
Aphis gossypii Glov.
Aphis illinoisensis Shimer
Aphis maidis Fitch
Aphis monardae Oestl.
Aphis oenotherae Oestl.
Aphis oestlundi Gill
Aphis sp.
Aphis spiraecola Patch
Brevicoryne brassicae (L.)
Capitophorus gillettei Theob.
Capitophorus sp.
Carolinaia cyperi Ainslie
Carolinaia sp.
Cinara taedae Tissot
Eriosoma crataegi (Oestl.)
Hysteroneura setariae (Thos.)
Macrosiphum ambrosiae (Thos.)
Macrosiphum erigeronensis (Thos.)
Macrosiphum granarium (Kby.)
Macrosiphum liriodendri (Mon.)
Macrosiphum pisi (Kltb.)
Macrosiphum solanifolii (Ashm.)
Macrosiphum sonchi (L.)
Macrosiphum sp.
Myzocallis discolor (Mon.)
Myzocallis sp.
Myzocallis trifolii (Mon.)
Myzus persicae (Sulz.)
Neothomasia pupulicola (Thos.)
Pemphigus sp.
Prociphilus sp.
Rhopalosiphum prunifoliae (Fitch)
Rhopalosiphum pseudobrassicae (Davis)
Rhopalosiphum sp.
Rhopalosiphum subterraneum Mason
Sipha flava (Forbes)
Toxoptera graminum (Rond.)
Trifidaphis phaseoli (Pass.)
Unilachnus parvus (Wilson)

LITERATURE CITED

Chamberlin, F. S. 1950. Source of Early Aphid Infestations in Shade-Grown Tobacco. Fla. Ent. 33: 16-17.

Shands, W. A., G. W. Simpson, and F. H. Lathrop. 1942. An Aphid Trap. U. S. Dept. Agr., Bur. Ent. and Pl. Quar. ET-196, 5 pp. [Processed].

NOTES ON TETRAGONEURIA SEPIA GLOYD, WITH DESCRIPTIONS OF THE FEMALE AND NYMPH[1]

MINTER J. WESTFALL, JR.

The adults of the genus *Tetragoneuria* have long been a problematical group for odonatologists. Several keys have been submitted for identification of the males, but the females are especially difficult of separation. There is still need for the assembly of more material and a further study of the adults such as those of Muttkowski (1911) and Davis (1933).

Only a few months after Davis published his summary of the genus, a new species, *T. sepia,* was described from Florida by Mrs. Leonora K. Gloyd on the basis of a single male taken near Greenville in Madison County, Florida, September 7, 1932. Since this specimen was flying about a swamp flooded by the adjacent Aucilla River, Mrs. Gloyd stated that it was impossible to say whether the normal habitat of the species was a sluggish stream or swamp pond.

In 1941 I reported the capture of this species in Florida. My first specimens taken were collected from a street in Orlando, at least one-half mile from water. The capture of other specimens in Nassau County and at Lake Redbug, Seminole County was also described. The earliest record yet is of the male taken in early March of 1939 on the west end of the Tamiami Trail by E. M. Davis. Another specimen in the Rollins College collection, according to my notes, was taken March 28 but this specimen has apparently been given away in exchanges and the exact locality is not known. Since that time the species has also been taken in Gainesville and a reared specimen from Tallahassee was recently determined for Mr. William Cross. The latest date of capture is that of a female taken November 15, 1936 in Seminole County by Mr. J. A. Fluno. Lake Placid is now added to the known range and this species appears to be widely distributed throughout the state. It may certainly be expected in Georgia also.

In my collection there are now seven females (others having been given away in exchanges), two of them reared specimens from lots of nymphs from which males also emerged. The others with the exception of the single specimen taken by Fluno were

[1] Contribution from the Department of Biology, University of Florida.

collected in association with males and have the characteristic appearance of the males. I am now offering a description of the female although a detailed study of all females in the genus is needed but must be left for the future.

Tetragoneuria sepia Gloyd

FEMALE: In most details the description of the female follows Mrs. Gloyd's description of the male.

Head. Labium light yellow; labrum golden yellow; clypeus and sides of frons olivaceous; front of frons golden yellow, darkening dorsally; upper part of frons black full-width near the vertex, with a metallic blue-black projection forward in the midline, forming a short stem of a T-spot; the dark stem spreads laterally a short distance in some specimens, in others it does not. Face covered with short dark brown pile. Rear of head black with a submarginal row of whitish hairs.

Thorax. As in male prothorax is brown, except margin of front lobe cream colored. Synthorax sepia above, which gives the species its name, becoming olivaceous brown on sides; lighter near antealar sinuses. A metallic blackish stripe on the humeral suture is conjoined below with another dark stripe occupying the lower half of the first lateral suture. This stripe is connected with one on the second lateral by a dark cross band around the metastigma which is itself narrowly outlined with a darker black. There is a distinctive bright yellow spot above and another below the metastigma, similar to those in *T. stella* Williamson but more conspicuous because the pile of the thorax is shorter, less dense, and browner than in that species. Intersternum as in male dark brown. Legs dark brown with exception of the coxae, front and middle trochanters and front femur which are light brown. Legs without tibial keels of male. Front and hind wings entirely hyaline in all seven females. Pterostigma medium to dark brown, darker and distinctly shorter than in *T. stella.*

Abdomen. Ground color yellowish brown; large ventro-lateral areas on segments 2 and 3 yellow, almost full-length and margined below with dark brown; segment 4 basally shows a similar yellow in some specimens, in others almost full-length there also; dark band, quite wide, begins on posterior half of segment 3 and becomes blackish brown to form a continuous band on dorsum of 4-10. Ventral margins of 3-7 and lateral carina of 4-8 black; abdominal appendages dark brown. Hairs on 1 and base of 2 brown to whitish, on appendages dark brown, elsewhere inconscpicuous or lacking. Appendages about as long as segment 9 dorsally. Subgenital plate as shown in figure.[2]

Venation. Antenodals, first and second series: front wing, 6 (14 wings); hind wing, 4 (13 wings—one shows 5 in second series only) or 5 (1 wing). Postnodals: front wing, 4 (1 wing) or 5 (10 wings) or 6 (2 wings); hind wing, 5 (10 wings) or 6 (3 wings) or 7 (1 wing). Substigmal series in both front and hind wings beginning between the

[2] The drawing of female was prepared by Miss Esther Coogle, staff artist, Department of Biology.

third and fourth antenodals except in 3 hind wings where it is betweeen the second and third. Triangles of front wings once crossed in all specimens; subtriangle of 3 cells (13 wings) or 2 cells (1 wing).

Tetragoneuria sepia Gloyd. Upper figure, photograph of full grown nymph; lower figure, ventral view of segments 9, 10 and appendages of female.

Measurements (in millimeters). Total length including appendages, 37-42; abdomen with appendages, 26-30; appendages 1.7; hind femur 6.7-7; hind wing 27-29.5; pterostigma 2.3.

Material examined. Seven females, all collected in Florida by me, unless stated otherwise. Orlando, April 21, 1940 (designated as the allotype and deposited in the collection of the Museum of Zoology, University of Michigan, along with the holotype); Nassau County, June 7, 1939; Seminole County, April 8, 1940; Seminole County, November 15, 1936, Coll. J. A. Fluno; Maitland, April 28, 1941, Coll. D. W. Thornton; reared specimen from Lake Redbug, Seminole County, emerged June 25, 1948; reared specimen from Lake Placid, emerged May 15, 1950, nymph collected by J. G. Needham and reared by me.

All of the males collected from southern Florida do not show any coloration of the wing base whatever and the membrane is clear. Males from Nassau County only show a coloration approaching that described for the holotype. In these the entire membrane is also slightly smokey.

NYMPH: While searching for the nymphs of *Gomphus australis* at Lake Redbug, Seminole County, Florida, in the spring of 1948 with Mr. J. A. Fluno, several nymphs of *Tetragoneuria* were found. They were taken from the floor of the lake in a mucky type of bottom, associated with the nymphs of *G. australis*, and transported to Gainesville where they were kept in pillow cages set in gallon jars of water. A male emerged June 10 and a female June 25. Four of the other nymphs were preserved before they emerged. In the spring of 1950 Dr. J. G. Needham brought to Gainesville a number of nymphs of this genus he had taken at Lake Placid. I cared for them hoping they might be the desired *T. stella* which I wished to compare with *sepia*, but when they emerged a male and female of *sepia* appeared on May 10 and May 15 respectively. Several other nymphs were preserved. From this material the following brief description is given.

Raptorial setae of the lateral labial lobe usually 6; four of nine specimens show at base of one side a small seventh which is less than half the size of the others. Mental setae usually 6 + 3 (the first series of 6 larger setae in line, the others out of line at end and smaller); two specimens have 7 + 3 each side, and a third has a small seventh seta in the first series on one side only. Lateral spines on segments 8 and 9, the one on 8 about one-sixth the length of the lateral margin of segment 8 of which it is a part, and incurved. Spines of 9 long and straight, slightly divergent, but varying somewhat in length. In most specimens it is about one-fifth longer than the length of segment 9 at the base of spine. In one specimen

(the one figured) it is almost one-half longer than the shortest distance from base of spine to the front margin of segment 9. The lateral, superior and inferior appendages measured in tenths of the length of the inferiors take as ten are about as 6 or 7:9:10. Dorsal hooks are on 2-9 as in the other species, those on 2 and 3 thin, needle-like, and straight, on 4 thin and decurved toward tip, highest on 5 and 6, becoming low and ridge-like on 9. Wing pads extend to middle of segment 6. Total length 20-21.5 mm., width of abdomen 7.5-8 and width of head 5.5-6.

The nymphs of this genus have not been well known. Needham (1901) presented a key to separate the nymphs of four species, *spinigera, cynosura, semiaquea* and *spinosa.* His *spinosa* was *canis* and the *semiaquea* was what is now considered *cynosura simulans.* The true *semiaquea* has probably been taken only in the south Atlantic states from New Jersey to Florida. Records from Massachusetts are said by Muttkowski to be doubtful. That species has not yet been reared but a specimen in the Cornell collection from North Carolina has been referred by supposition to *semiaquea.* Broughton (1928) described *stella* from supposition, but it is difficult from the description to be sure that she did not have *sepia.* I hope to successfully rear *stella* soon. Dr. Needham has reared a female of *petechialis* from New Mexico. It was collected at the Bottomless Lakes near Roswell and emerged May 5, 1936. The characters of this and all known species will be given in key and tabular form in the forthcoming *Manual of the Odonata of North America.* In this reared *petechialis* the spines of 9 are long, pointing directly backward, their axes parallel, but they are not quite so long as the distance across 9 from their base to segment 8, whereas in *sepia* and our supposed specimens of *stella* they are longer than this distance. The dorsal hooks of *petechialis* are a little more sharply pointed than in *cynosura.* The adults of *petechialis* and *stella* have been closely associated by students of the genus. How different the true nymph of *stella* is from that of *petechialis* will be known when the former species has also been reared. The specimens Dr. Needham and I have tentatively referred to *stella* have 7 lateral setae consistently and 7 + 3 mentals, also the spines of 9 much like those of *sepia.* Further distinctive characters will be sought when we have reared the remaining species. The nymphs of *spinosa, williamsoni* and *morio* (this may not be a valid species) are still unknown. As stated previously we have *semiaquea* and *stella* only by supposition.

BIBLIOGRAPHY

Broughton, Elsie. 1928. Some new Odonata nymphs. Canad. Ent., 60:32-34, figs.

Davis, W. T. 1933. Dragonflies of the genus *Tetragoneuria*. Bull. Brooklyn Ent. Soc., 28:87-104, figs.

Gloyd, Lenora K. 1933. A new Corduline dragonfly, *Tetragoneuria sepia*, from Florida (Odonata). Occ. Pap. Mus. Zool. Univ. Mich., 274:1-5, figs.

Muttkowski, R. A. 1911. Studies in *Tetragoneuria*. Bull. Wis. Nat. Hist. Soc., 9:91-134, figs.

..... 1915. Studies in *Tetragoneuria* (Odonata). II. Bull. Wis. Nat. Hist. Soc., 13:49-61.

Needham, J. G. 1901. Aquatic insects in the Adirondacks. Bull. N. Y. State Mus., 47:489-495, figs.

Westfall, M. J., Jr. 1941. Notes on Florida Odonata. Ent. News, 52:15-16.

THE NAME OF THE COMMON EASTERN SPIROBOLID MILLIPED

RICHARD L. HOFFMAN
Blacksburg, Virginia

Information accumulated during the preparation of a check-list of North American millipeds reveals the unfortunate necessity of having to change the specific name of what is probably, to the average zoologist, the most familiar American species. This is the form long known as *Spirobolus marginatus.*

Described by Thomas Say in 1821 under the name *Julus marginatus,* this species was placed in the Brandtian genus *Spirobolus* by our pioneer student of diplopods, Horatio C. Wood, in 1865. With few exceptions, all subsequent workers have uncritically accepted Wood's disposition of the name.

In 1893, however, a posthumously published article by C. H. Bollman pointed out that Say's name is obviously a junior primary homonym of *Julus marginatus* Olivier, 1792. Curiously enough, this observation has been overlooked by all later investigators. Bollman further showed that Say's name was in all probability based on the population of Florida and adjacent regions, now known as *S. spinigerus* Wood. These two facts serve to demonstrate that the other, more northern, spirobolid of the Eastern Seaboard is left without a specific name. Bollman suggested usage of an old name proposed by Palisot de Beauvois in 1805—*Julus americae borealis.*

Dr. E. A. Chapin, to whom I appealed for information about the original Beauvois description, has kindly supplied some very pertinent facts bearing on the nomenclature as well as a copy of page 155 of *Insectes recueillis en Afrique et Amerique.*

Dr. Chapin points out, in a letter dated September 21, 1950:

"The legend on Plate 4—Apteres shows that Palisot at one time intended to call the species *Julus americanus.* . . .The text on page 155 shows the different name, *Julus americae borealis.* This is not hyphenated. According to Griffin's findings, this page of text and Plate 4—Apteres were published simultaneously. Therefore we have a case of simultaneous synonymy and the first reviser has the right to select one of the two names."

However, it is understood that, in such cases, no selection has been made if the selector fails to mention both names. Bollman in 1893 did not point out that two names were originally

available, and it is thus felt that he did not make a selection.[1] There is no objection to the present choice of *Julus americanus* for the proper name. In any event the other name, being trinominal, is not properly proposed and is thus unoccupied.

The figures on Plate 4 are good, but do not show any characters of a specific nature (such as male gonopods). Some workers might prefer to regard the species as unidentifiable, but I feel that since there is at least a strong likelihood of conspecificity involved, I am inclined to arbitrarily adopt the name *americanus* for the animal heretofore known as *Spirobolus marginatus*.

The species will now be *Spirobolus americanus* (Beauvois). It is known to occur from at least Maryland south and west to Louisiana and the upper Mississippi Valley (exact limits of range very imperfectly known). In Virginia, and North Carolina, it is a lowland form, and is replaced in the mountains by *S. dolleyi* (Loomis).

Various specific names proposed by early American workers, notably *ornatus* and *atratus* Girard, 1854, and *agilis* Cope, 1869, have been thrown into the synonymy of *"marginatus"* by Wood and Bollman. It is scarcely possible, without a painstaking revision of the genus, to properly evaluate these names, but it is felt that at least the first two may be specifically or subspecifically distinct.

There is no way to be sure of the provenance of Beauvois' type specimen and probably it will become desirable to designate an empirical type locality. Many of the species described by Beauvois are known to have come from the vicinity of Philadelphia, Pennsylvania, which might well be chosen for a restricted type locality. I hesitate to take such action, however, until such a time as it is possible to study the genus in some detail.

REFERENCES

Beauvois, Palisot, 1805. Insects receuillis en Afrique et Amerique. Apteres.

Bollman, Charles H., 1893. Notes upon the species of Myriapoda Syngnatha, described by Thomas Say. Bull. U. S. Nat. Mus., no. 46, pp. 144-149.

Say, Thomas, 1821. Description of the myriapodae of the United States. Journ. Acad. Nat. Sci. Phila. 2:102-114.

Wood, Horatio C., 1865. The Myriapoda of North America. Trans. Amer. Philos. Soc., ser. 2. 13:137-148.

[1] Bollman (1893, p. 146) stated, in a footnote "This name [*americae-borealis*] has been reduced and mutilated by Gervais and other authors, to *americanus*." He was obviously unaware that Beauvois himself had used the latter name.

THE AQUATIC AND SEMIAQUATIC HEMIPTERA OF NORTHERN FLORIDA. PART 3: NEPIDAE, BELOSTOMATIDAE, NOTONECTIDAE, PLEIDAE AND CORIXIDAE

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This paper completes the annotated lists of the families of aquatic and semi-aquatic Hemiptera of northern Florida; two families, Hydrometridae and Naucoridae, have been omitted. I published taxonomic and distributional notes on the family Hydrometridae in 1948 and no new data have been gathered. The family Naucoridae has been omitted as I am now undertaking a taxonomic revision of the genus *Pelocoris*.

Part 4 of this series will include keys to the species and a classification of the northern Florida habitats.

FAMILY NEPIDAE

Genus RANATRA Fabricius

The members of this genus, known commonly as alligator fleas and water scorpions, are all quite similar in their life history and habits. They have been taken in all habitats which provide coves and bays with a layer of black silt or leaf debris. On many occasions, they have been collected from the tangled roots of water hyacinths and their eggs are usually laid in the floats of this plant. Occasionally, eggs have been collected from the stems of grass growing along the edge of streams. Mating and oviposition seem to occur at night, and usually take place on floating or emergent vegetation.

Ranatra nigra Herrich-Schaeffer

Adults of this form have been taken throughout the year; nymphs in April, July and August.

SPECIMENS EXAMINED: *Alachua Co.:* Biven's Arm of Payne's Prairie, March 22, 1946, W. Beck, 1 ♂; March 27, 1948, D. E. Miller, 1 ♂; March 30, 1946, W. Beck, 2 ♂ ♂, 1 ♀; April 2, 1946, W. Beck, 1 ♂, 1 ♀; April 23, 1946, W. Beck, 1 nymph; July 13, 1946, W. Beck, 2 ♂ ♂; sinkhole pond, 3 miles southeast of Gainesville on Pearl Street Road, October 17, 1934, H. T. Townsend, 1 ♂, 1 ♀; February 3, 1935, H. T. Townsend, 1 ♀; Lake Wauberg, April 23, 1935, A. M. Laessle, 4 ♂ ♂; May 7, 1938, collector unknown,

1 ♂; August 15, 1946, H. G. and P. Dowling, 1 ♂; Lake Alice, November 12, 1937, S. H. Spurr, 1 ♂; May 24, 1938, S. H. Spurr, 4 ♂ ♂, 1 ♀, 4n; Twin Oaks Pond, August 8, 1946, H. G. and P. Dowling, 1n; Cross Creek, May 22, 1947, 1 ♂.

Ranatra kirkaldyi Bueno

This species is known to me from only two Florida specimens; one from a Nymphaea marsh and the other from a sand-bottomed lake.

SPECIMENS EXAMINED: *Alachua Co.:* Biven's Arm of Payne's Prairie, March 12, 1946, W. Beck, 1 ♀. *Marion Co.:* Lake Bryant, April 16, 1938, S. H. Spurr, 1 ♀.

Ranatra buenoi Hungerford

Adults of *R. buenoi* have been collected in January, February, March, April, May, September, October and November. A single nymph was taken in November.

SPECIMENS EXAMINED: *Alachua Co.:* sinkhole pond, 3 miles southeast of Gainesville on Pearl Street Road, November 10, 1934, H. T. Townsend, 1 ♂, 1 ♀; January 3, 1935, H. T. Townsend, 1 ♂; February 3, 1935, H. T. Townsend, 1 ♂; Hogtown Creek, February 29, 1932, collector unknown, 1 ♂; May 16, 1947, 1 ♂, 1 ♀; Hogtown Sink at entrance of the creek, May 1, 1947, 1 ♀; Biven's Arm of Payne's Prairie, November 12, 1946, W. Beck, 2 ♀ ♀; November 15, 1946, W. Beck, 1 ♂; Blues Creek, 6 miles northwest of Gainesville, April 10, 1947, 1 ♂; swamp near Blues Creek, September 11, 1947, 1 ♂; sinkhole in Hibiscus Gardens, Gainesville, March 16, 1934, A. M. Laessle, 1 ♂. *Levy Co.:* Otter Creek, April 13, 1948, 2 ♂ ♂; hammock pond near Williston, March 22, 1947, J. Grant and K. Strawn, 1 ♂.

Ranatra drakei Hungerford

Gainesville, Florida, is the type locality of *R. drakei.* It is also kown from Raleigh, North Carolina, and the Marion County, Florida, locality listed below.

SPECIMENS EXAMINED: *Alachua Co.:* Twin Oaks Pond, August 3, 1946, H. G. and P. Dowling, 1 ♀; August 8, 1946, H. G. and P. Dowling, 1 ♂; sinkhole pond 3 miles southeast of Gainesville on the Pearl Street Road, January 3, 1935, H. T. Townsend, 1 ♀; June 20, 1935, H. T. Townsend, 1 ♀. *Marion Co.:* sinkhole pond in the southwest corner of Ocala National Forest, 6 miles southeast of Moss Bluff, March 19, 1938, O. E. Frye, 1 ♂.

Ranatra australis Hungerford

I have found this to be the most prevalent *Ranatra* in Florida. It abounds in almost every type of aquatic habitat—the grassy

margins of roadside ditches, the silty coves of sinkholes, or the masses of water hyacinths along the creeks and inlets of rivers.

SPECIMENS EXAMINED: *Alachua Co.:* sinkhole pond 3 miles southeast of Gainesville on the Pearl Street Road, March 22, 1934, H. T. Townsend, 2♂♂, 2♀♀; June 30, 1934, H. T. Townsend, 3♂♂, 2♀♀; October 17, 1934, H. T. Townsend, 7♂♂, 1♀; November 10, 1934, H. T. Townsend, 1n; December 8, 1934, H. T. Townsend, 4♂♂, 1♀; January 3, 1935, H. T. Townsend, 2♂♂, 3♀♀; February 3, 1935, H. T. Townsend, 3♂♂, 3♀♀; March 9, 1935, H. T. Townsend, 7♂♂, 5♀♀; April 15, 1935, H. T. Townsend, 2♂♂, 7♀♀; May 24, 1935, H. T. Townsend, 1♀; June 20, 1935, H. T. Townsend, 4♂♂, 3♀♀; November 14, 1935, H. T. Townsend, 3♀♀; Biven's Arm of Payne's Prairie, February 17, 1937, S. H. Gaylord, 1♀; March 5, 1946, W. Beck, 1♀; March 18, 1946, W. Beck, 1♀; Twin Oaks Pond, August 8, 1946, H. G. and P. Dowling, 1♂; May 14, 1948, F. N. Young, 2♀♀, 1n; Hogtown Sink, March 27, 1947, 2♂♂; May 16, 1947, 3♂♂, 1♀; River Styx, 6 miles southeast of Gainesville, April 13, 1947, 2♂♂; small pond 500 yards north of River Styx, April 13, 1947, 1♂; sinkhole in Hibiscus Gardens, Gainesville, A. M. Laessle, 1♂; flatwoods pond, 1 mile northwest of Devil's Millhopper, September 16, 1947, 2♂♂, 2♀♀, 3n; Miller's Pond, 4.2 miles east of Science Hall on the Newman Lake Road, August 13, 1946, 1n; Freezer's Pond 1½ miles northwest of Science Hall, March 13, 1937, F. N. Young and L. Berner, 1♀; Cross Creek, May 22, 1947, 1♂; small shallow pond ½ mile northwest of University of Florida tennis courts, February 28, 1937, F. N. Young and L. Berner, 1♀. *Dixie Co.:* small pond underneath Suwannee River Bridge, September 9, 1947, 1♂. *Putnam Co.:* St. John's River, 4½ miles southeast of Bostwick, March 28, 1948, 1♀.

FAMILY BELOSTOMATIDAE

Genus BENACUS Stal

Benacus griseus (Say)

This is the largest of the Florida "electric light bugs." It seems to prefer the grassy flatwoods ponds but the largest collections have been made from lights at night: On warm nights after a rain, while the streets are still wet, *Benacus* flies to city lights in great numbers. They are quite clumsy on the pavement, and dozens of them can be found dead and trampled on the streets on the following day. In Gainesville, they prefer the flourescent lights of the State Theatre. On many occasions I have found them at no other place. Other writers (sc. Blatchley, 1926) mention that *Benacus griseus* comes to lights in the early summer only. I have collected specimens in February, June and August at lights, and on several occasions, this species has been taken in company with *Lethocerus uhleri.* Usually, one

or the other predominated, but they never occurred in equal numbers.

SPECIMENS EXAMINED: *Alachua Co.:* State Theatre, Gainesville, February 12, 1948, 1♀; August 2, 1948, 4♂♂, 3♀♀; Piggie Park, Gainesville, June 2, 1948, no specimens preserved; Miller's Pond, 4.2 miles east of Science Hall on the Newman Lake Road, August 8, 1946, 2n; Biven's Arm of Payne's Prairie, July 13, 1946, W. Beck, 1♀; Payne's Prairie, May 6, 1947, 1♀.

Genus LETHOCERUS Mayr

Lethocerus uhleri (Montandon)

Like *Benacus griseus*, this species is most easily collected on wet nights at lights. As far as I know, the habits and life history of this form are very much like those of *B. griseus*. Nymphs have been collected in August.

SPECIMENS EXAMINED: *Alachua Co.:* sinkhole pond, 3 miles southeast of Gainesville on the Pearl Street Road, January 3, 1935, H. T. Townsend, 1♀; June 20, 1935, H. T. Townsend, 1♂; Santa Fe River near Poe Springs, May 14, 1934, H. T. Townsend, 1♀; May 21, 1934, H. T. Townsend, 1♀; State Theatre, Gainesville, September 11, 1947, 11♂♂, 29♀♀; August 2, 1948, 10♂♂, 9♀♀; Gainesville business district, May 10, 1947, 1♂; Payne's Prairie, May 6, 1947, 1♀; Miller's Pond, 4.2 miles east of Science Hall on Newman Lake Road, August 20, 1946, 2n.

Genus BELOSTOMA Latreille

Belostoma lutarium (Stal)

This is the most common belostomatid in north Florida. It has been taken in almost all types of habitats. This species has never been taken at lights, although it is capable of flight.

Males with clusters of eggs on their backs have been taken in March, April, and May. Nymphs have been collected in April, May, July, September, October and November.

SPECIMENS EXAMINED: *Alachua Co.:* Biven's Arm of Payne's Prairie, February 17, 1937, S. H. Gaylord, 2♂♂, 4♀♀; January 31, 1946, W. Beck, 1♂; March 12, 1946, W. Beck, 1♂, 1♀; March 19, 1946, W. Beck, 2♂♂, 4♀♀; March 30, 1946, W. Beck, 2♂♂, 1♀; April 8, 1946, W. Beck, 1♂, 2♀♀, 1n; April 27, 1946, W. Beck, 1n; April 30, 1946, W. Beck, 1n; July 10, 1946, W. Beck, 2♂♂, 1♀; July 13, 1946, W. Beck, 1♀, 3n; October 15, 1946, W. Beck, 5♂♂, 1♀, 4n; October 31, 1946, W. Beck, 1♂; November 5, 1946, W. Beck, 2♀♀, 1n; April 15, 1947, W. Beck, 1♂; sinkhole pond, 3 miles southeast of Gainesville on the Pearl Street Road, March 30, 1934, H. T. Townsend, 1♀; October 17, 1934, H. T. Townsend, 1n; November 10,

1934, H. T. Townsend, 1n; December 18, 1934, H. T. Townsend, 4♂♂, 1♀; January 3, 1935, H. T. Townsend, 5♂♂, 2♀♀; March 9, 1935, H. T. Townsend, 4♂♂, 5♀♀; April 15, 1935, H. T. Townsend, 5♂♂, 1♀; June 20, 1935, H. T. Townsend, 1♂, 1♀; September 27, 1937, H. T. Townsend, 1n; Santa Fe River, May 14, 1934, R. Rubin, 1♂, 2n; May 21, 1934, collector unknown, 4n; Poe Springs on the Santa Fe River, May 14, 1934, J. B. McCullagh, 2n; May 21, 1934, W. Stirling, 1n; Pond "C", 3 miles southwest of Gainesville, April 4, 1933, J. S. Rogers, 1♀; May 18, 1933, collector unknown, 2n; Hogtown Sink, March 27, 1947, 1♂, 1♀; sinkhole in Hibiscus Gardens, Gainesville, A. M. Laessle, 1♀; Alachua Sink, March 14, 1937, collector unknown, 1♂; Prairie Creek, on Florida Highway 20, March 26, 1948, 1♂; Big Hatchet Creek, February 27, 1947, I. J. Cantrall et al, 2♂♂; Lake Wauberg, April 30, 1938, J. R. Preer, 5n; Lake Alice, March 17, 1937, S. H. Gaylord, 3♀♀; River Styx, 6 miles southeast of Gainesville, April 13, 1947, 1♂, 4♀♀.

Belostoma testaceum (Leidy)

This species has been collected in most of the habitats that the other belostomatids inhabit except that it has not been collected at lights.

Males with eggs have been taken in February, March, April and May. Nymphs have been collected in April and May.

SPECIMENS EXAMINED: *Alachua Co.:* Biven's Arm of Payne's Prairie, October 22, 1946, W. Beck, 1♀; February 25, 1927, Sholze, 2♂♂; April 15, 1947, W. Beck, 1♂; Pond "C", 3 miles southwest of Gainesville, March 2, 1933, collector unknown, 1♂; April 4, 1933, J. S. Rogers, 1♂, 3n; May 18, 1933, J. Kilby, 2♂♂, 2♀♀, 6n; Payne's Prairie, March 12, 1947, J. Haeger, 1♂; Hogtown Sink, March 27, 1947, 1♀; Big Hatchet Creek, February 27, 1947, I. J. Cantrall et al, 1♀.

Genus ABEDUS Stal

Abedus immaculatus (Say)

The taxonomic status and locality records of this species have been discussed in two recent papers by Hussey and Herring (1950a, b).

FAMILY NOTONECTIDAE

Genus NOTONECTA Linnaeus

Notonecta indica Linnaeus

This species prefers the smaller ponds and ditches where there is an abundance of submerged vegetation. It has been taken most frequently in the roadside ditches, sinkholes, and

fluctuating ponds in hammocks. Tremendous numbers of *indica* were collected in November from a small ditch approximately four feet wide and ten or fifteen feet long on Payne's Prairie. The ditch was filled almost completely with a thick mass of aquatic plants. By using a seine, Mr. Herndon Dowling and I were able to collect hundreds of adults and nymphs in only a very few minutes. The only other aquatic hemipteran collected was *Gerris canaliculatus*. In September, Kirk Strawn collected several adults and nymphs from a sewage dump at the Alachua County Airbase. They were taken along with 395 specimens of *Buenoa scimitra*.

I have collected adults in almost every month of the year, and nymphs in January, February, March, April, May, August, September and November.

SPECIMENS EXAMINED: *Alachua Co.:* Twin Oaks Pond, July 30, 1946, 1♀; August 3, 1946, H. G. and P. Dowling, 1♀, 2n; August 7, 1946, H. G. and P. Dowling, 2♂♂, 2♀♀, 9n; August 8, 1946, H. G. and P. Dowling, August 13, 1946, 1n; Pond "C", 3 miles southwest of Gainesville, collector unknown, 1♂; April 4, 1933, J. S. Rogers, 9n; May 8, 1933, J. S. Rogers, 3♂♂, 1♀, 2n; May 18, 1933, J. Kilby, 2♂♂, 11 n; January 5, 1938, J. S. Rogers, 1♂, 1n; Lake Lochloosa, February 3, 1937, F. N. Young, 1♀; Sewage Dump, Alachua Airbase, September 1, 1947, K. Strawn, 3♂♂, 4♀♀, 4n; cypress pond, ½ mile west of Alachua Airbase, August 31, 1947, K. Strawn, 1♀, 4n; Hailes Siding Pond on Payne's Prairie, November 23, 1947, 20♂♂, 35♀♀, 8n; flatwoods pond, 100 yards east of Gainesville city limits on the Hawthorne road, April 5, 1934, J. S. Rogers, 3♀♀; temporary woods pond on the west end of Payne's Prairie, 400 yards south of Haile's Siding, April 1, 1934, J. S. Rogers, 1♂; Pond "A"?, Sugarfoot Hammock, February 16, 1933, collector unknown, 3♂♂, 5♀♀. *Levy Co.:* sinkhole near Williston, March 22, 1947, K. Strawn, 3♂♂, 1♀, 9n. *Marion Co.:* sinkhole pond in southwest corner of Ocala National Forest, 6 miles southeast of Moss Bluff, February 26, 1938, S. H. Spurr, 6♂♂, 4♀♀, 1n; March 19, 1938, O. Frye, 1♂, 1n.

Notonecta uhleri Kirkaldy

I have collected this species in only one type of habitat. This was a very acid swamp-and-bog stream. The decaying branches and logs along the shore of this stream are covered by rank growths of sphagnum moss. It is a well shaded stream with a pH that ranges from 4.3 to 5.3.

The life history of *N. uhleri* is unknown. One adult female was collected in April and a male in September.

SPECIMENS EXAMINED: *Alachua Co.:* Blues Creek, 6 miles northwest of

Gainesville, April 10, 1947, 1♀; Blues Creek Swamp, September 11, 1947, 1♂.

Genus BUENOA Kirkaldy

Buenoa margaritacea Bueno

This form appears to be entirely unselective in its choice of habitat. It has been taken from all of the usual types of habitats, and in addition from borrow pits and swimming pools which were almost devoid of any vegetation. Bueno records it from a rock hole in a trap-rock quarry and Hussey (1922) found it in large numbers in a concrete tank at New Buffalo, Michigan.

SPECIMENS EXAMINED: *Alachua Co.:* Twin Oaks Pond, August 3, 1946, H. G. and P. Dowling, 1♂, 1♀; August 8, 1946, H. G. and P. Dowling, 1♀, 1n; temporary woods pond on the west end of Payne's Prairie, 400 yards south of Hailes Siding, April 1, 1934, J. S. Rogers, 3♀♀; April 8, 1934, J. S. Rogers, 1♂; sinkhole in Palm Terrace, Gainesville, January 5, 1938, O. Frye, 2♀♀; flatwoods pond, 100 yards east of Gainesville city limits on the Hawthorne road, April 5, 1934, J. S. Rogers, 4♂♂, 12♀♀; borrow pit, T.9S., R.20E., S.14, June 7, 1947, I. J. Cantrall, 1♂, 5♀♀. *Levy Co.:* high pine-turkey oak pond, 10 miles northeast of Cedar Key on Florida Highway 24, October 12, 1947, 2♂♂, 2n.

Buenoa limnocastoris Hungerford

I have collected this form only from a flatwoods pond in Putnam County. The pond is rather shallow and overgrown with *Ludwigia* sp. and *Myriophyllum* sp. This is the first record of the species from Florida.

SPECIMENS EXAMINED: *Putnam Co.:* flatwoods pond near Camp Rosa, 4½ miles southeast of Bostwick, August 24, 1948, 4♂♂, 6♀♀.

Buenoa elegans (Fieber)

B. elegans has been taken more often in the fluctuating ponds of the hammock regions, although it does occur rather commonly in the other habitats.

I have adults that were collected in January, May, July and August.

SPECIMENS EXAMINED: *Alachua Co.:* Twin Oaks Pond, July 30, 1946, 2♀♀, 1n; August 3, 1946, H. G. and P. Dowling, 4♂♂, 5♀♀, 15n; August 7, 1946, H. G. and P. Dowling, 1♂, 3♀♀, 5n; August 13, 1946, 2♀♀; Pond "C", 3 miles southwest of Gainesville, May 8, 1933, J. S. Rogers, 2♀♀; May 18, 1933, J. Kilby, 2♂♂, 4♀♀, 2n; sinkhole in Palm Terrace, Gainesville, January 5, 1938, O. Frye, 1♂, 3♀♀.

Buenoa scimitra Bare

Like many of the other species of *Buenoa*, this form occupies a wide choice of habitats. Most of the habitats in which it was taken were choked with tangles of aquatic vegetation.

I have adult specimens that were collected during the following months: January, February, April, and September. Nymphs have been taken only in September. This is a new record for Florida.

SPECIMENS EXAMINED: *Alachua Co.:* sewage dump at Alachua Airbase, September 1, 1947, K. Strawn, 200♂♂, 160♀♀, 35n; temporary woods pond, 400 yards south of Hailes Siding on the west end of Payne's Prairie, April 8, 1934, J. S. Rogers, 7♂♂, 7♀♀; flatwoods pond, 100 yards east of Gainesville city limits on the Hawthorne road, April 5, 1934, J. S. Rogers, 14♂♂, 15♀♀; sinkhole in Palm Terrace, Gainesville, January 5, 1938, O. Frye, 5♀♀; Pond "A"?, Sugarfoot Hammock, February 16, 1933, collector unknown, 11♂♂, 15♀♀. *Marion Co.:* sinkhole pond in southwest corner of Ocala National Forest, 6 miles southeast of Moss Bluff, February 26, 1938, S. H. Spurr, 3♀♀.

FAMILY PLEIDAE

Genus PLEA Leach

Plea striola Fieber

I have adults of this tiny water bug that were collected in January, February, March, April, August, November and December. Nymphs were collected in August.

SPECIMENS EXAMINED: *Alachua Co.:* sinkhole, 3 miles southeast of Gainesville on the Pearl Street Road, November 22, 1934, H. T. Townsend, 1♀; December 18, 1934, H. T. Townsend, 1♂; January 3, 1935, H. T. Townsend, 4♀♀; Biven's Arm of Payne's Prairie, April 5, 1937, collector unknown, 3♂♂, 4♀♀; March 6, 1947, 3♂♂, 1♀; Twin Oaks Pond, August 8, 1946, H. G. and P. Dowling, 4♂♂, 3♀♀, 2n; Lake Alice, March 17, 1937, S. H. Gaylord, 1♂, 1♀; Lake Wauberg, December 3, 1932, collector unknown, 1♂; sinkhole in Palm Terrace, Gainesville, January 5, 1938, O. Frye, 3♂♂, 8♀♀; sinkhole in Hibiscus Gardens, Gainesville, A. M. Laessle, 2♂♂, 3♀♀; temporary woods ponds, 400 yards south of Haile's Siding on the west end of Payne's Prairie, March 27, 1943, J. S. Rogers, 3♂♂, 3♀♀; San Felasco Hammock Pond, November 28, 1947, 1♂. *Marion Co.:* sinkhole pond in southwest corner of Ocala National Forest, 6 miles southeast of Moss Bluff, February 26, 1938, S. H. Spurr, 13♂♂, 5♀♀.

FAMILY CORIXIDAE

Almost every mudhole or ditch in northern Florida has pro-

duced a different species of corixid. The family is the largest one in this area and is represented at present by fourteen species. Due to the local distribution of the forms, northern Florida is probably far richer in number of species than the fourteen thus taken would seem to indicate.

Genus HESPEROCORIXA Kirkaldy

Hesperocorixa interrupta (Say)

The only specimens of this species known to me were taken from a mudhole known as Pond 1 (Dickinson, 1949). Excerpts from his description follow:

"A small pond located in a pasture that is often heavily stocked with cattle and horses. The pond is roughly circular in outline and has the broad shallow contours of a watch glass. The surface of its east quadrat was hidden in summer during the period from June, 1940, to March, 1942, beneath a dense mat of a nearly pure stand of the spiny aquatic perennial, *Nama quadrivalve*. By 1945, however, most of this growth had been replaced by *Persicaria* sp. A few scattered clumps of two species of *Juncus* are found in this emergent growth as well as along the margins. The remainder of the pond is practically devoid of any permanent vegetation except for small patches of *Persicaria* sp. along the north and south margins. The water is usually muddy (Secchi disc disappeared at less than one foot on several occasions), due, no doubt in large measure, to the fact that the bottom is composed of soft clay that is repeatedly stirred by the horses and cattle as they use it as a water hole. . . . The pond was completely dry on two occasions during the twenty months covered in the study, once for a period of some weeks during November and December, 1940, and once for two days in June, 1941. This pond is permanent throughout most 'normal' years."

SPECIMENS EXAMINED: *Alachua Co.:* temporary pond, T.10S., R.19E., S.14-23, April 16, 1941, J. C. Dickinson and W. Beck, 9♂♂, 11♀♀.

Hesperocorixa brimleyi (Kirkaldy)

This is a new record for Florida. *H. brimleyi* has been collected in only two localities in this area. One of the two is an extensive marsh overgrown with *Pontederia* sp. and *Panicum hemitomum*. The second is a roadside ditch.

SPECIMENS EXAMINED: *Alachua Co.:* roadside ditch in a cypress swamp between Rochelle and Grove Park, October 8, 1948, B. Cooper, 3♂♂, 4♀♀; Hawthorne Prairie, February 16, 1949, 2♀♀.

Hesperocorixa nitida (Fieber)

This form was collected from the same mudhole with *H. interrupta*, and from a grassy ditch on the margin of a marsh.

SPECIMENS EXAMINED: *Alachua Co.:* temporary pond, T.10S., R.19E., S.14-23, April 16, 1941, J. C. Dickinson and W. Beck, 13♂♂, 16♀♀; temporary woods pond, 400 yards south of Haile's Siding on the west end of Payne's Prairie, April 8, 1934, J. S. Rogers, 1♀.

Hesperocorixa lucida (Abbott)

I have not taken this species in the area under consideration but it probably occurs here since I have numerous specimens taken at a light in Jefferson County.

SPECIMENS EXAMINED: *Jefferson Co.:* Monticello, May 9, 1932, F. Walker, 27♂♂, 22♀♀.

Hesperocorixa martini (Hungerford)

H. martini is a fairly abundant form. It has been collected in various sinkholes and a cypress-gum swamp with a pH varying from 4.9 to 5.7. Adults have been collected in March, May, August and December.

SPECIMENS EXAMINED: *Alachua Co.:* Twin Oaks Pond, August 3, 1946, H. G. and P. Dowling, 1♀; August 20, 1946, H. G. Dowling, 1♂, 1♀; May 14, 1948, F. N. Young, 1♂; Green Sink, campus of University of Florida, March 8, 1938, collector unknown, 1♀; cypress-gum swamp, T.10S., R.21E., S.19, December 28, 1947, D. E. Miller, 1♀. *Marion Co.:* sinkhole pond in southwest corner of Ocala National Forest, 6 miles southeast of Moss Bluff, March 19, 1938, O. Frye, 1♂.

Genus SIGARA Fabricius

Sigara hubbelli (Hungerford)

This species is known only from the mudhole in which *H. interrupta* and *H. nitida* were taken.

SPECIMENS EXAMINED: *Alachua Co.:* temporary pond, T.10S., R.19E., S.14-23, April 16, 1941, J. C. Dickinson and W. Beck, 13♂♂, 37♀♀, 7n.

Sigara bradleyi (Abbott)

This form is known from sinkholes, flatwoods ponds and sand-bottomed lakes.

SPECIMENS EXAMINED: *Alachua Co.:* sinkhole pond, 3 miles southeast of Gainesville on the Pearl Street Road, November 22, 1934, H. T. Townsend, 1♂, 1♀; December 8, 1934, H. T. Townsend, 1♀; Twin Oaks Pond, August 7, 1946, H. G. and P. Dowling, 1♂, 1♀; Pond "B", Sugarfoot Hammock,

October 21, 1947, 1♂. *Marion Co.:* unknown pond in Ocala National Forest, February 19, 1938, collector unknown, 1♀; Lake Bryant, April 16, 1938, S. H. Spurr, 2♂♂, 3♀♀. *Putnam Co.:* flatwoods pond Camp Rosa, 4½ miles southeast of Bostwick, August 24, 1948, Adrian Hancock, 1♂, 2♀♀.

Sigara sigmoidea (Abbott)

This southern form is not specific in its selection of habitat. It has been taken in the hammock-region ponds, sinkhole ponds, flatwoods ponds and in a borrow pit that was almost devoid of vegetation.

Adults have been collected in February, July, August and October. I have not seen nymphs of this species.

SPECIMENS EXAMINED: *Alachua Co.:* Twin Oaks Pond, August 3, 1946, H. G. and P. Dowling, 1♂, 5♀♀; borrow pit, T.9S., R.20E., S.14, July 7, 1947, I. J. Cantrall, 3♀♀; Pond "B", Sugarfoot Hammock, October 21, 1947, 1♂. *Marion Co.:* sinkhole pond in southwest corner of Ocala National Forest, 6 miles southeast of Moss Bluff, February 26, 1938, S. H. Spurr, 1♂, 1♀. *Putnam Co.:* flatwoods pond near Camp Rosa, 4½ miles southeast of Bostwick, August 24, 1948, Adrian Hancock, 1♂, 8♀♀.

Sigara zimmermani (Fieber)

S. zimmermani occupies an assortment of habitats. It occurs in a modified calcareous stream, a sand-bottomed lake, a very acid swamp-and-bog stream, and has been taken from various sinkholes and fluctuating ponds in hammocks.

There are adults in my collection that were collected in the following months: February, March, May, September, October and December. Nymphs are unknown to me.

SPECIMENS EXAMINED: *Alachua Co.:* Santa Fe River near Poe Springs, May 8, 1947, 2♂♂, 1♀; Lake Santa Fe, December 4, 1947, E. D. McRae, 1♀; Blues Creek, 6 miles northwest of Gainesville, September 21, 1947, 1♂; Blues Creek Swamp, September 11, 1947, 1♀; sinkhole, 3 miles southeast of Gainesville on the Pearl Street Road, December 8, 1934, H. T. Townsend, 1♀; Pond "B", Sugarfoot Hammock, October 21, 1947, 1♀. *Marion Co.:* sinkhole pond in southwest corner of Ocala National Forest, 6 miles southeast of Moss Bluff, March 19, 1938, O. Frye, 5♀♀.

Genus PALMACORIXA Abbott

Palmacorixa buenoi Abbott

P. buenoi appears to be primarily a lake form. It has also been collected in sinkholes. I have adults that were collected in February, March and December.

SPECIMENS EXAMINED: *Alachua Co.:* Lake Newman, March 16, 1932, collector unknown, 1 ♂ ; Orange Lake, December 26, 1947, G. K. Reid, 1 ♂ ?, 1 ♀. *Marion Co.:* Swim Pond, 6 miles southeast of Moss Bluff, February 19, 1938, O. Frye, 1 ♀ ; sinkhole pond, 6 miles southeast of Moss Bluff, February 26, 1938, S. H. Spurr, 3 ♂ ♂.

Genus TRICHOCORIXA Kirkaldy

Trichocorixa louisianae Jaczewski

Although it has been taken from two sand-bottomed creeks, *T. louisianae* was taken in greater numbers in a Nymphaea marsh. In one of the sand-bottomed creeks, the water was very high due to recent rains and the swift current had caused masses of leaf-debris to collect along the shore. A single specimen was collected from the leaf-debris in the dark, acid-stained water.

Ten nymphs were collected from a Nymphaea marsh in March.

SPECIMENS EXAMINED: *Alachua Co.:* Biven's Arm of Payne's Prairie, March 2, 1933, J. S. Rogers et al, 5 ♂ ♂, 26 ♀ ♀, 10n; River Styx, 6 miles southeast of Gainesville, January 31, 1948, 1 ♂ ; Big Hatchet Creek, April 24, 1948, I. J. Cantrall et al, 1 ♂.

Trichocorixa verticalis verticalis (Fieber)

This race appears to be strictly confined to the coast in Florida. The only specimens seen from this area by me were taken along the Coastal Lowlands, as defined by Cooke (1939). Almost one hundred specimens were collected in a roadside ditch one mile northeast of Cedar Key. The water in the ditch was very salty and vegetation was thick. The corixids were so abundant that it was possible to scoop them up with the bare hands. At the other locality, three miles northeast of Cedar Key, they were collected from fresh water in a small sand-bottomed creek located in a mesic hammock.

SPECIMENS EXAMINED: *Levy Co.:* 1 mile northeast of Cedar Key, Florida Highway 24, December 31, 1947, 26 ♂ ♂, 31 ♀ ♀, 50n; 3 miles northeast of Cedar Key, Florida Highway 24, December 31, 1947, 1 ♂.

Trichocorixa minima (Abbott)

This form is abundant in Nymphaea marshes. It has been taken in the sand-bottomed lakes and occasionally in the hammock ponds. It appears to prefer the Nymphaea marshes as it has been collected there almost year-round, but rather rarely in the other habitats.

I have nymphs from a Nymphaea marsh that were collected in November and December.

SPECIMENS EXAMINED: *Alachua Co.:* Biven's Arm of Payne's Prairie, February 12, 1946, W. Beck, 3♂♂, 1♀, 15n; March 1, 1946, W. Beck, 1♂, 2♀♀; April 30, 1946, W. Beck, 1♀; July 13, 1946, W. Beck, 1♂, 2♀♀; October 31, 1946, W. Beck, 1♀; November 13, 1947, 12♂♂, 6♀♀, 7n; Twin Oaks Pond, August 3, 1946, H. G. and P. Dowling, 3♀♀; Lake Wauberg, April 30, 1938, J. R. Preer, 1♂, 2♀♀; Lake Santa Fe, December 16, 1947, 1♂; sinkhole in Palm Terrace, Gainesville, O. Frye, 1♂, 1♀; Pond "B", Sugarfoot Hammock, October 21, 1947, 1♂.

Trichocorixa naias (Kirkaldy)

T. naias is not very selective in its choice of a habitat. It appears to be equally abundant in the fluctuating flatwoods and hammock ponds, sinkholes, lakes, rivers, Nymphaea marshes, and swamp-and-bog streams.

SPECIMENS EXAMINED: *Alachua Co.:* Biven's Arm of Payne's Prairie, January 31, 1946, W. Beck, 1♂, 1♀; July 27, 1947, 1♂; Santa Fe River at Worthington Springs, February 6, 1949, 2♀♀; Lake Santa Fe, December 16, 1947, 1♀; Lake Newman, March 16, 1932, collector unknown, 1♀; Lake Alice, October 17, 1948, collector unknown, 1♂, 3♀♀; Twin Oaks Pond, August 7, 1946, H. G. and P. Dowling, 1♂, 1♀; Blues Creek Swamp, 6 miles northwest of Gainesville, September 11, 1947, 1♂; sinkhole in Palm Terrace, Gainesville, January 5, 1938, O. Frye, 1♂; Miller's Pond, 4.2 miles east of Science Hall on Newman Lake Road, October 4, 1937, J. R. Preer, 2♂♂, 9♀♀. *Levy Co.:* 1 mile northeast of Cedar Key, December 31, 1947, I. J. Cantrall, 1♂; hammock stream, 3 miles northeast of Cedar Key, ¼ mile south of Florida Highway 24, December 31, 1947, 1♂, 3♀♀.

LITERATURE CITED

Blatchley, W. S. 1926. Heteroptera or True Bugs of eastern North America. 1116 pp. Indianapolis.

Cooke, C. W. 1939. Scenery of Florida. Fla. Geol. Surv. Bul. 17, 118 pp., 58 figs.

Dickinson, J. C., Jr. 1949. An ecological reconnaissance of the biota of some ponds and ditches in northern Florida. Quart. Jour. Fla. Acad. Sci. 11 (2-3): 1-28.

Herring, Jon L. 1948. Taxonomic and distributional notes on the Hydrometridae of Florida. (Hemiptera). Fla. Ent. 31 (4): 112-116.

Hussey, Roland F. 1922. Hemiptera from Berrien County, Michigan. Occas. Papers, Univ. Mich. Mus. Zool. No. 118: 1-39.

Hussey, Roland F. and Jon L. Herring 1950a. A remarkable new belostomatid (Hemiptera) from Florida and Georgia. Fla. Ent. 33 (2): 85-89, 2 figs.

..... 1950b. Rediscovery of a belostomatid named by Thomas Say (Hemiptera). Fla. Ent. 33 (4): 154-156.

MINUTES OF THE THIRTY-THIRD ANNUAL MEETING OF THE FLORIDA ENTOMOLOGICAL SOCIETY

The thirty-second annual meeting of the Florida Entomological Society was held in Sanford, Florida, at the Mayfair Inn during December 7 and 8, 1950. The meeting started at 9:00 A.M. December 7, with papers being given during the morning and afternoon sessions. An outdoor barbecue was held at the Sanford Country Club on the night of the 7th. On December 8, papers were presented from 9 to 11, after which followed the business meeting of the society.

The business meeting was called to order by President John A. Mulrennan. The reading of the minutes of the 1949 meeting was dispensed with as they had been published in Volume 33, Nos. 2 and 3, of the FLORIDA ENTOMOLOGIST. President Mulrennan called for the report of the Secretary. Mr. Murphey, secretary, reported on the Executive Committee meeting of August 28, 1950, which acted upon the suggestions made by President Van Horn at the 1949 meeting. The action of the Executive Committee was as follows:

1. A post office box has been secured in Gainesville, Florida. It is Box 2425, University of Florida, Gainesville, Florida.
2. All letter heads of the society in the future will be standardized, for use of all officers, and the practice of the various officers printing stationery with their own names, to be discontinued.
3. Applications for membership in the future will be printed with the permanent post office box in Gainesville as the mailing address of the society.
4. A committee was appointed to study the constitution with the idea of amending it to permit the executive committee to elect entomologists to membership in the society, so it would be unnecessary to have a full meeting of the society to bring in new members. The following members were appointed to this committee, Dr. Wilson, Mr. Toffaletti, Dr. Griffiths.

Also in point 4, concerning the appointing of a committee to secure ads for the FLORIDA ENTOMOLOGIST, the Business Manager reported that 25 per cent of the magazine now consisted of advertising, and that he saw no need of this committee being appointed. The Business Manager questioned the advisability of having more than 25 per cent of the magazine advertising matter. He also reported that he could obtain more ads if it was the wish of the Society.

5. The matter of electing a permanent secretary was discussed, but due to the financial status of the society it is recommended the Society proceed as in the past. The Executive Committee recommends to the Society that a token payment of $25.00 annually be given to the Business Manager to help him in carrying out his duties.
6. The Secretary be empowered to employ student help. No action was taken on this because it was the belief of the committee that the Secretary had this power at the present time.

A discussion followed the above report. Dr. Griffiths said he did not think an author should be charged for tables and cuts in his articles—that if necessary more ads should be added to pay for same. Dr. Kelsheimer said he agreed with Dr. Griffiths. Dr. Kuitert said he did not like to charge, but the policy of the FLORIDA ENTOMOLOGIST was to charge the author when cuts exceeded one-half page.

A motion was made by Dr. Griffiths to accept the report of the Secretary. Seconded by Dr. Wilson. Passed.

President Mulrennan said the books would have to be checked again because of an error before the next meeting of the Society. Dr. Kuitert called for a report of the Auditing Committee. Mr. Toffaletti said the next meeting would be Gainesville and the mistake could be ironed out. Dr. Wilson recommended the Business Manager be allowed to work on his books. This motion passed. President Mulrennan brought up the matter of not over one-third of the FLORIDA ENTOMOLOGIST being advertising. Mr. Toffaletti made a motion the advertising rate be increased $5.00 a half page and $5.00 per full page. Mr. Deckle said he didn't think the FLORIDA ENTOMOLOGIST was at the present time of a nature where we could go up on the price because the lack of commercial papers. Dr. Griffiths seconded Mr. Toffaletti's motion. Dr. Wilson said he thought it was a matter of the Business Manager to increase costs if he can get it. Dr. Spencer asked if bids had been obtained for the printing of the FLORIDA ENTOMOLOGIST. Dr. Kuitert said someone had passed on to him word that the Pepper Printing Company had carried the Society during hard times, and also the Pepper Printing Company was located in Gainesville, and for this reason no bids had been obtained. Dr. Spencer said we should follow good business practices. Mr. Rogers said advertising costs should increase with printing costs. Mr. Lawrence said members should be solicited for more articles, thereby, getting more advertising and still stay within one-third or one-fourth ads. Mr. Hayslip asked if we could take contributions instead of more ads, and

suggested a committee be appointed to work on this matter. Dr. Griffiths asked a commercial man to comment on sustaining memberships. Motion passed 18 to 9.

Dr. Wolfenbarger moved the appointment of a committee to study ways and means of the society. Seconded by Dr. Spencer. Dr. Wilson wanted to amend the motion to study the possibility of discontinuing the FLORIDA ENTOMOLOGIST. Dr. Wolfenbarger refused Dr. Wilson's amendment. Motion carried.

Mr. Hayslip moved to add to the duties of the above committee the duties to work out ways and means of increasing the number of economic papers to be published in the FLORIDA ENTOMOLOGIST. Motion carried. President Mulrennan appointed the committee as follows: Mr. Toffaletti, Mr. True, Mr. Russell, Dr. Tissot and Dr. Kelsheimer.

The Report of the Resolutions Committee, consisting of Dr. Wolfenbarger, Mr. Rogers and Dr. Spencer presents the following recommendation, that:

Be it resolved that the FLORIDA ENTOMOLOGICAL SOCIETY, in recognition of the many efforts expended for it does hereby recognize and appreciate the following:

1. The Reverend A. G. McGinnis, Pastor of the First Presbyterian Church, Sanford, and the Honorable Andrew Carraway, Mayor of the City of Sanford, who gave freely and graciously of their time to offer the invocation and address of welcome,
2. Dr. J. W. Wilson, Mr. Jack Russell, and Mr. James P. Toffaletti, who constituted the local committee on arrangements put forth much personal effort and gave unstintingly of their time in arranging the meeting place, barbecue, and entertainment for the ladies, which was largely responsible for the great success of the 33rd annual meeting.
3. The Shell Oil Company which generously supplies refreshments at the barbecue,
4. The personnel of the Mayfair Inn who showed unusual hospitality and courtesy in their efforts to make the meeting a sucess,
5. The outgoing officers of the Society for their excellent services during the past year, and recommends that the Secretary be instructed to write a letter of appreciation and thanks to each and every person and/or organization named above.

A second set of resolutions were presented to the Society by the committee. The Resolutions Committee present the following recommendation, that,

Be it resolved that the Florida Entomological Society, in recognition of its outstanding successes, compliments these workers and is whole heartedly in accord with the efforts of Federal and State malarial con-

trol authorities. The Resolutions Committee urges the continued support of this program, and recommends that more widespread publicity be given to the accomplishments attained by these workers.

The above resolutions were adopted by the society.

President Mulrennan called for a report of the Nominating Committee consisting of Mr. Van Horn, Dr. Tissot, and Dr. Kelsheimer:

President	W. G. Bruce
Vice President	John Wilson
Secretary	Milledge Murphey, Jr.
Editor	Lewis Berner
Associate Editor	A. N. Tissot
Executive Committee	John Diem

Motion made that the Secretary be instructed to cast a unanimous ballot for the new slate of officers.

As the next order of business, President Mulrennan called on the Secretary for a report on new members. Mr. Murphey in turn called on Dr. Kuitert, the Business Manager for a list of proposed members. For election to membership from associate membership: J. F. Aycock, C. C. Ballentine, J. E. Bussart, R. C. Colter, C. J. D'Angio, W. P. Dean, R. F. Hussey, G. H. Lucas, A. S. Mills, E. T. Nielsen, S. B. Parnell, C. V. Reichart, C. F. Rollins, G. D. Sloan, W. N. Stoner, R. B. Trueman, F. N. Turner, R. E. Williams.

For Associate membership: T. C. Burns, W. B. Bradock, Elizabeth C. Beck, F. Gray Butcher, Thomas L. Cain, Jr., W. B. Hayter, Calvin M. Jones, Henry Kaplan, R. M. Pratt, Daniel R. Murphy, M. W. Provost, Raymond R. Sheppard, C. L. Sutton.

For student membership: Marshal Nirenberg.

The above individuals were elected to membership in the society.

Dr. Kuitert reported student members pay only 50 cents and the cost of sending them the FLORIDA ENTOMOLOGIST was 35 cents a copy. He moved the student members be charged one dollar a year. Motion carried 14 to 12.

President Mulrennan then turned the chair over to the incoming president, Mr. W. G. Bruce, who thanked the society for the honor that had been bestowed on him.

The business meeting was adjourned.

MILLEDGE MURPHEY, JR.
Secretary

NEWS ITEMS

Frank N. Turner, of Jacksonville, has been appointed assistant sales manager of the Florida Agricultural Supply Company, one of the largest insecticide manufacturing plants in the southeast.

Turner's appointment was announced recently by M. C. Van Horn, manager of FASCO, which is a division of the Wilson & Toomer Fertilizer Company with general offices and plant in Jacksonville.

A native of Heflin, Alabama, Turner attended Heflin High School, Athens, Ala., and was graduated from Alabama Polytechnic Institute, Auburn, Ala., with a B.S. degree in agricultural science in 1947. From January of 1941 to August of 1945 he served as a technical sergeant with the U. S. Army and saw two and a half years of combat action in the Aleutians and nearly a year in the European Theatre.

Son of Mr. and Mrs. Alf M. Turner, of Heflin, his father is a retired farmer. Turner worked on his father's farm as a boy and at the age of 14, purchased his own mule and established a profitable business raising cotton, corn and peas.

After college, he was first employed by the Capital Chemical Drug Company at Montgomery, Ala., as a salesman. Later he joined the sales staff of the Agricultural Sulphur and Chemical Company of Dothan, Ala. In June of 1949 Turner was named Alabama representative for the Florida Agricultural Supply Company.

Turner is married and has one stepson. His appointment as FASCO's assistant sales manager became effective September 1 and he succeeds the late D. L. Evans, Jr., who died from injuries suffered in an automobile accident several months ago.

* * * * *

The annual meeting of the Association of Southeastern Biologists will be held on the campus of the University of Alabama, Tuscaloosa, from April 21-22.

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